

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	vii
1.0 PURPOSE AND NEED	1-1
1.1 Introduction.....	1-1
1.1.1 Need for Agency Action.....	1-1
1.1.2 Regulatory Framework.....	1-5
1.1.3 Public Involvement	1-6
1.2 Cerro Grande Fire Effects and Risks.....	1-7
1.3 Purpose of This Document and Related NEPA Analyses and Other Documents	1-11
2.0 EMERGENCY ACTIONS UNDERTAKEN	2-1
2.1 Introduction.....	2-1
2.2 Fire Suppression Actions	2-4
2.2.1 LANL-wide Fire Suppression Activities	2-4
2.2.2 Watershed-specific Fire Suppression Activities.....	2-7
2.3 Post-fire Actions	2-8
2.3.1 LANL-wide Post-fire Activities	2-8
2.3.2 Watershed-specific Post-fire Activities	2-21
2.3.2.1 Los Alamos Canyon Watershed.....	2-24
2.3.2.2 Pajarito Canyon Watershed.....	2-27
2.3.2.3 Other Watersheds.....	2-32
2.4 Mitigations Measures.....	2-33
3.0 AFFECTED ENVIRONMENT	3-1
3.1 Introduction.....	3-1
3.2 Land Use	3-2
3.3 Geology and Soils	3-3
3.3.1 Geology	3-3
3.3.2 Soils.....	3-3
3.3.2.1 Post-fire Acreage of Hydrophobic Soils	3-3
3.3.2.2 Post-fire Acreage of Hydrophobic Soils by Watershed	3-6
3.4 Water Resources	3-6
3.4.1 Surface Water.....	3-7
3.4.2 Groundwater.....	3-8
3.5 Floodplains and Wetlands	3-8
3.5.1 Floodplains.....	3-9
3.5.2 Wetlands.....	3-9
3.5.2.1 By Watersheds	3-15
3.6 Biological Resources.....	3-17
3.6.1 ROI.....	3-18
3.6.1.1 Habitat Changes	3-18
3.6.1.2 Threatened and Endangered Species Conditions	3-19
3.6.1.3 Other Wildlife	3-19
3.6.2 LANL-Wide	3-19
3.6.2.1 Habitat Changes	3-19
3.6.2.2 Federal and State Listed Threatened and Endangered Species Conditions.....	3-20
3.6.2.3 Other Wildlife	3-23
3.7 Climatology, Meteorology, and Air Quality	3-23
3.8 Visual Resources.....	3-25
3.9 Cultural Resources	3-27
3.10 Utilities and Infrastructure	3-31
3.11 Socioeconomics	3-31
3.12 Noise	3-32
3.13 Environmental Justice	3-32
3.14 Human Health	3-33
3.15 Environmental Restoration and Waste Management	3-33
3.15.1 Environmental Restoration at LANL	3-33

3.15.2 Waste Management 3-34

3.16 Transportation 3-35

4.0 ENVIRONMENTAL CONSEQUENCES 4-1

4.1 Introduction..... 4-1

4.2 Land Use 4-2

4.2.1 Effects of Fire Suppression Activities 4-2

4.2.2 Effects of Post-fire Activities 4-2

4.2.3 Cumulative Effects 4-2

4.3 Geology and Soils 4-3

4.3.1 Effects of Fire Suppression Activities 4-3

4.3.2 Effects of Post-fire Activities 4-3

4.3.3 Effects of Post-fire Activities by Watershed 4-3

4.3.4 Cumulative Effects 4-4

4.4 Water Resources 4-4

4.4.1 Effects of Fire Suppression Activities 4-4

4.4.2 Effects of Post-fire Activities 4-5

4.4.3 Cumulative Effects 4-6

4.5 Floodplains and Wetlands 4-6

4.5.1 Effects of Fire Suppression Activities 4-6

4.5.2 Effects of Post-fire Activities 4-7

4.5.3 Cumulative Effects 4-9

4.6 Biological Resources..... 4-10

4.6.1 Effects of Fire Suppression Activities 4-10

4.6.2 Effects of Post-fire Activities 4-10

4.6.3 Cumulative Effects 4-11

4.7 Climatology, Meteorology, and Air Quality 4-11

4.7.1 Effects of Fire Suppression Activities 4-11

4.7.2 Effects of Post-fire Activities 4-12

4.7.3 Cumulative Effects 4-14

4.8 Visual Resources..... 4-14

4.8.1 Effects of Fire Suppression Activities 4-14

4.8.2 Effects of Post-fire Activities 4-14

4.8.3 Cumulative Effects 4-14

4.9 Cultural Resources 4-15

4.9.1 Effects of Fire Suppression Activities 4-15

4.9.2 Effects of Post-fire Activities 4-15

4.9.3 Cumulative Effects 4-16

4.10 Utilities and Infrastructure 4-16

4.10.1 Effects of Fire Suppression Activities 4-16

4.10.2 Effects of Post-fire Activities 4-17

4.10.3 Cumulative Effects 4-17

4.11 Socioeconomic 4-18

4.11.1 Effects of Fire Suppression Activities 4-18

4.11.2 Effects of Post-fire Activities 4-18

4.11.3 Cumulative Effects 4-18

4.12 Noise 4-18

4.12.1 Effects of Fire Suppression Activities 4-18

4.12.2 Effects of Post-fire Activities 4-19

4.12.3 Cumulative Effects 4-19

4.13 Environmental Justice 4-20

4.13.1 Effects of Fire Suppression Activities 4-20

4.13.2 Effects of Post-fire Activities 4-20

4.13.3 Cumulative Effects 4-20

4.14 Human Health 4-20

4.14.1 Effects of Fire Suppression Activities 4-20

4.14.2 Effects of Post-fire Activities 4-21

4.14.3	Cumulative Effects	4-22
4.15	Environmental Restoration and Waste Management	4-23
4.15.1	Effects of Fire Suppression Activities	4-23
4.15.2	Effects of Post-fire Activities	4-23
4.15.3	Cumulative Effects	4-24
4.16	Transportation	4-25
4.16.1	Effects of Fire Suppression Activities	4-25
4.16.2	Effects of Post-fire Activities	4-25
4.16.3	Cumulative Effects	4-25
4.17	Summary of Impacts	4-26
4.17.1	Impacts at LANL.....	4-26
4.17.2	Impacts on Watersheds within the ROI.....	4-28
5.0	REGULATORY CONSULTATION AND COMPLIANCE.....	5-1
5.1	U.S. Fish and Wildlife Service.....	5-1
5.2	New Mexico State Historic Preservation Office	5-2
5.3	Clean Air Act	5-2
5.4	Clean Water Act.....	5-3
5.5	Resource Conservation and Recovery Act.....	5-4
6.0	REFERENCES.....	6-1
APPENDIX A.....		A-1
Glossary		G-1

Tables

Table 2.1	Watersheds Where Actions were Conducted	2-4
Table 2.2	Area (ac/ha) of Ground Disturbed at LANL during the Fire Suppression Period	2-8
Table 2.3	LANL Structures Damaged or Destroyed by the Cerro Grande Fire	2-9
Table 2.4	91 PRSs Affected by Fire.....	2-19
Table 2.5	Floodplain PRSs: Status of Accelerated Actions as of August 24, 2000	2-20
Table 2.6	U.S. Army Corps of Engineers Fire Rehabilitation Actions.....	2-22
Table 3.1	Burned Areas and Hydrophobic Soils in each Watershed Affected by the Cerro Grande Fire	3-6
Table 3.2	Hydrological Model Output Estimates for Burned Watersheds	3-7
Table 3.3	Vegetation Mortality on Floodplains by Watershed.....	3-15
Table 3.4	Total Percentage of Vegetation Mortality on LANL within each Vegetation Zone.....	3-18
Table 3.5	Total Percentage of Vegetation Mortality within Selected Watersheds at LANL.....	3-20
Table 3.6	Federal Threatened or Endangered Species Considered Under the Fire Suppression Activities and Emergency Actions.....	3-21
Table 3.7	Total Percentage of Vegetation Mortality within the Core Area of each Mexican Spotted Owl AEI	3-21
Table 3.8	New Mexico Threatened and Endangered Species Potentially Occurring in the Area of Fire Suppression and Emergency Actions	3-22
Table 3.9	Cultural Resources within Burned Areas and Pre-fire 100-Year Floodplain	3-28
Table 3.10	Historic Resources Affected by Cerro Grande Fire or Post-fire Flooding	3-28
Table 4.1	Watershed Treatment Areas (ac/ha)	4-3
Table 4.2	Radiological Emissions from Construction Activities in Areas with Contaminated Soils... ..	4-13
Table 4.3	Summary of Impacts	4-26

Figures

Figure 1.1	Location of Los Alamos National Laboratory.....	1-2
Figure 1.2	Extent of the Cerro Grande Fire	1-3
Figure 1.3	Burn Severity Categories within the Region of Influence (ROI)	1-9
Figure 1.4	LANL Technical Areas	1-15
Figure 2.1	Watersheds in the ROI	2-3
Figure 2.2	Fire Suppression Features within LANL.....	2-6

Figure 2.3	Erosion Control Treatments within LANL.....	2-13
Figure 2.4	Potential Release Sites within the Burned Area at LANL.....	2-18
Figure 2.5	Major Flood Control Projects at LANL	2-23
Figure 3.1	Post-fire Soil Erosion Estimates in the ROI.....	3-4
Figure 3.2	Hydrophobic Soils in the ROI	3-5
Figure 3.3	Los Alamos Canyon Watershed with Burn Severity and 100-Year Pre-fire Floodplain.....	3-10
Figure 3.4	Sandia Canyon Watershed with Burn Severity and 100-Year Pre-fire Floodplain	3-11
Figure 3.5	Mortandad Canyon Watershed with Burn Severity and 100-Year Pre-fire Floodplain.....	3-12
Figure 3.6	Pajarito Canyon Watershed with Burn Severity and 100-Year Pre-fire Floodplain.....	3-13
Figure 3.7	Water Canyon Watershed with Burn Severity and 100-Year Pre-fire Floodplain	3-14

Photos

Photo 1.1	Cerro Grande Fire at LANL May 11, 2000.....	1-4
Photo 1.2	Cerro Grande Fire Damage to Los Alamos Townsite May 12, 2000.....	1-4
Photo 1.3	Upper Los Alamos Canyon and Los Alamos Reservoir after the Cerro Grande Fire	1-8
Photo 1.4	Example of High-Severity Burn (Inset: High-Intensity Crown Fire).....	1-8
Photo 1.5	Example of Moderate-Severity Burn.....	1-10
Photo 1.6	Example of Low-Severity Burn (Inset: Low-Intensity Fire)	1-10
Photo 2.1	Slurry Being Dropped	2-2
Photo 2.2	Firefighter Felling Burned Tree	2-5
Photo 2.3	Helicopter Dropping Muddy Water on Fire	2-7
Photo 2.4	LANL Trailer Burned by the Cerro Grande Fire.....	2-10
Photo 2.5	Burned Transportable at LANL.....	2-10
Photo 2.6	Concrete Barriers to Prevent Storm Water Damage at Historic Cabin.....	2-12
Photo 2.7	Contour Raking	2-14
Photo 2.8	Burned Area with Straw Mulch.....	2-14
Photo 2.9	Spraying Hydromulch	2-15
Photo 2.10	Contour Felling	2-16
Photo 2.11	Rock Check Dam on Burned Slope.....	2-16
Photo 2.12	Straw Wattles in Severely Burned Area.....	2-17
Photo 2.13	Storm Water Protection around Utility Pole.....	2-20
Photo 2.14	Multiple Rock Gabions being Assembled at Los Alamos Canyon Weir.....	2-21
Photo 2.15	Reinforcing Los Alamos Reservoir	2-25
Photo 2.16	Debris Catcher or “Trash Rack”	2-26
Photo 2.17	Los Alamos Canyon Weir Near SR 4 Under Construction	2-27
Photo 2.18	ACMs Used to Reinforce Road.....	2-28
Photo 2.19	Base of Flood Retention Structure in Pajarito Canyon Under Construction	2-29
Photo 2.20	Steel Diversion Wall at TA-18 Under Construction.....	2-30
Photo 2.21	Detail of Joined Steel Panels	2-30
Photo 2.22	Trash Rack above TA-18 with Steel Diversion Wall in Background.....	2-31
Photo 3.1	Burned Residential Unit in Los Alamos Townsite	3-2
Photo 3.2	Elk Calf in the Los Alamos Area	3-18
Photo 3.3	Smoke from the Cerro Grande Fire Spreads Eastward toward LANL	3-24
Photo 3.4	Severely Burned Mountain Slopes above Los Alamos Townsite.....	3-26
Photo 3.5	Anchor Ranch Icehouse before June 28, 2000, Flooding.....	3-29
Photo 3.6	Anchor Ranch Icehouse after Flooding.....	3-29
Photo 3.7	V-Site in 1999	3-30
Photo 3.8	Portion of V-Site Destroyed in the Cerro Grande Fire.....	3-30
Photo 4.1a	Understory Regeneration in Seeded and Mulched Areas, August 3, 2000.....	4-12
Photo 4.1b	Understory Regeneration in Seeded and Mulched Areas, August 3, 2000.....	4-12
Photo 4.2	Charcoal-laden Sediment Deposited by Runoff from Burned Areas.....	4-15